

WHAT IS CLAIMED IS:

SUB
1. A multiband data communication apparatus which receives signals by switching a plurality of frequency bands in response to a band switching signal, said multiband data
5 communication apparatus comprising

quadrature demodulating means for converting either a reception signal or a reception intermediate frequency signal into a quadrature reception baseband signal, said quadrature demodulating means including:

10 a pair of first quadrature mixers for converting either the reception signal or the reception intermediate frequency signal into a reception baseband signal;

local oscillating means for producing a local oscillation signal; and

15 phase shifting means for shifting a phase of said local oscillation signal based upon said band switching signal to thereby supply the phase-shifted local oscillation signal to said first quadrature mixers.

20 2. A multiband data communication apparatus which transmits signals by switching a plurality of frequency band in response to a band switching signal, said multiband data communication apparatus comprising:

quadrature modulating means for converting a quadrature
25 transmission baseband signal into either a transmission signal

00420:005550

or a transmission intermediate frequency signal, said quadrature modulating means including:

5 a pair of second quadrature mixers for converting a transmission baseband signal into either the transmission signal or the transmission intermediate frequency signal;

local oscillating means for producing a local oscillation signal; and

10 phase shifting means for shifting a phase of said local oscillation signal based upon said band switching signal to thereby supply the phase-shifted local oscillation signal to said second quadrature mixers.

3. A multiband data communication apparatus comprising:

15 quadrature modulating means for converting a quadrature transmission baseband signal into either a transmission signal or a transmission intermediate frequency signal;

20 quadrature demodulating means for converting either a reception signal or a reception intermediate frequency signal into a quadrature reception baseband signal; and

25 local oscillation signal producing means for supplying a local oscillation signal to both said quadrature modulating means and said quadrature demodulating means, for transmitting/receiving by switching a plurality of frequency bands in response to a band switching signal,

RECEIVED
JAN 10 1960

5 said quadrature modulating means includes a pair of
second quadrature mixers for converting a transmission baseband
signal into either the transmission signal or the transmission
intermediate frequency signal; and

15

20

25

claimed in claim 1, 2, or 3, wherein said phase shifting means supplies said local oscillation signal to one of said first quadrature mixers and said second quadrature mixers, while said phase shifting means supplies one of a signal obtained by shifting the phase of said local oscillation signal by $\pi/2$ and a signal obtained by shifting the phase of said local oscillation signal by $\pi/2$ and by inverting said phase-shifted local oscillation signal to the other mixer of said first quadrature mixers and said second quadrature mixers in response to said band switching signal.

6. A multiband data communication apparatus as claimed in claim 1, 2, or 3, wherein phase shifting means supplies said local oscillation signal to one of said first quadrature mixers and said second quadrature mixers, while said phase shifting means supplied one of a signal obtained by delaying the phase of said local oscillation signal by $\pi/2$ and a signal obtained by advancing the phase of said local oscillation signal by $\pi/2$ to the other of said first quadrature mixers and said second quadrature mixers in response to said band switching signal.

7. A multiband data communication apparatus which receives signals by switching a plurality of frequency bands in response to a band switching signal, said multiband data communication apparatus comprising:

quadrature demodulating means for converting either a reception signal or a reception intermediate frequency signal into a quadrature reception baseband signal, said quadrature demodulating means including:

5 a pair of first quadrature mixers for converting either the reception signal or the reception intermediate frequency signal into a reception baseband signal;

storage means for saving thereinto discrete data of a frequency pattern component functioning as a base;

10 address generating means for generating an address every preselected clock;

phase shift means for adding a predetermined number based upon said band switching signal to said address;

15 first analog converting means for analog-converting data which is read out by addressing said storage means based on the address outputted from said address generating means to thereby supply the analog-converted data to one of said first quadrature mixers; and

20 second analog converting means for analog-converting data which is read out by addressing said storage means based on the output of said phase shift means to thereby supply the analog-converted data to the other of said first quadrature mixers.

25 8. A multiband data communication apparatus which

quadrature modulating means for converting a quadrature
5 transmission baseband signal into either a transmission signal
or a transmission intermediate frequency signal, said quadrature
modulating means including:

storage means for saving therein discrete data of a frequency pattern component functioning as a base;

address generating means for generating an address every
preselected clock;

phase shift means for adding a predetermined number based upon said band switching signal to said address;

first analog converting means for analog-converting data which is read out by addressing said storage means based on the address outputted from said address generating means to thereby supply the analog-converted data to one of said second quadrature mixers; and

second analog converting means for analog-converting data which is read out by addressing said storage means based on the output of said phase shift means to thereby supply the analog-converted data to the other of said second quadrature

- 95 -

multiband data communication apparatus

modulating means for converting a quadrature baseband signal and signal into either a transmission intermediate frequency signal;

demodulating means for converting either a transmission intermediate frequency signal or a reception intermediate frequency signal into a quadrature baseband signal; and

oscillation signal producing means for supplying a local oscillation signal to both said quadrature modulating means and said quadrature demodulating means; and

transmitting/receiving means, for transmitting/receiving a signal in a plurality of frequency bands in response to a received signal or a transmitted signal;

said quadrature demodulating means includes a pair of quadrature mixers for converting either the transmission intermediate frequency signal or the reception intermediate frequency signal into a quadrature baseband signal;

said quadrature modulating means includes a pair of quadrature mixers for converting a quadrature baseband signal and a local oscillation signal into either a transmission intermediate frequency signal or a reception intermediate frequency signal; and

oscillation signal producing means including a frequency divider for dividing a free running oscillation signal producing means into a plurality of discrete data of a frequency band.

quadrature modulating means for converting a quadrature transmission baseband signal into either a transmission signal or a transmission intermediate frequency signal;

quadrature demodulating means for converting either a reception signal or a reception intermediate frequency signal into a quadrature reception baseband signal; and

local signal producing means for supplying a local oscillation signal to both said quadrature modulating means and said quadrature demodulating means, for transmitting/receiving by switching a plurality of frequency bands in response to a band switching signal,

wherein: said quadrature demodulating means includes a pair of first quadrature mixers for converting either the reception signal or the reception intermediate frequency signal into a reception baseband signal;

said quadrature modulating means includes a pair of second quadrature mixers for converting a transmission baseband signal into either the transmission signal or the transmission intermediate frequency signal; and

said local oscillation signal producing means includes
storage means for saving therein discrete data of a frequency

pattern component functioning as a base; address generating means for generating an address every preselected clock; phase shift means for adding a predetermined number based upon said band switching signal to said address; first analog converting means
5 for analog-converting data which is read out by addressing said storage means based on the address outputted from said address generating means to thereby supply the analog-converted data to one of said first quadrature mixers; and second analog converting means for analog-converting data which is read out by addressing
10 said storage means based on the output of said phase shift means to thereby supply the analog-converted data to the other of said first quadrature mixers.

10. A multiband data communication apparatus as
15 claimed in claim 7, 8, or 9, wherein either said quadrature modulating means or said local oscillation signal producing means includes:

clock generating means for generating a clock signal; and
interval determining means for determining a clock
20 interval used to read out data from said storage means so as to control the address generating operation of said address generating means.

11. A communication method of a multiband data
25 communication apparatus including quadrature demodulating means

for converting either a reception signal or a reception intermediate frequency signal into a quadrature reception baseband signal, for receiving by switching a plurality of frequency bands in response to a band switching signal, said communication method comprising the steps of:

producing a local oscillation signal;

shifting a phase of said local oscillation signal in response to said band switching signal to thereby supply the phase-shifted local oscillation signal to a first quadrature mixer for converting either the reception signal or the reception intermediate frequency signal into a reception baseband signal.

12. A communication method of a multiband data communication apparatus including quadrature modulating means for converting a quadrature transmission baseband signal into either a transmission signal or a transmission intermediate frequency signal, for transmitting by switching a plurality of frequency band in response to a band switching signal, said communication method comprising the steps of:

producing a local oscillation signal; and

shifting a phase of said local oscillation signal in response to said band switching signal to thereby supply the phase-shifted local oscillation signal to a second quadrature mixer for converting a transmission baseband signal into either the transmission signal or the transmission intermediate

1.

communication method of a multiband communication apparatus including quadrature modulation means for a quadrature transmission baseband signal, a transmission signal or a transmission intermediate frequency signal; and quadrature demodulating means for a reception signal or a reception intermediate frequency signal into a quadrature reception baseband signal, and receives signals by switching a plurality of said baseband signals in response to a band switching signal.

Method comprising the steps of:

generating a local oscillation signal; and
selecting a phase of said local oscillation signal in response to a band switching signal to thereby supply a selected local oscillation signal to one of a first quadrature mixer and a second quadrature mixer, said first quadrature mixer converting either the reception signal or the transmission signal into a reception intermediate frequency signal into a reception intermediate frequency signal and said second quadrature mixer converting a transmission baseband signal into either the transmission intermediate frequency signal.

communication method of a multiband communication apparatus as claimed in claim 11, 12, or 13.

5
10

shifting a phase of said ~~local~~ oscillation signal in

15

20

25

said phase shifting step includes:

5 a first supplying step for supplying a signal which is
obtained by shifting the phase of said local oscillation signal
by $\pi/2$ to one of said first quadrature mixer and said second
quadrature mixer;

an inverting step for inverting a code of said local
oscillation signal; and

10 a second supplying step for supplying one of said local
oscillation signal and the output signal of said inverting step
to the other of said first quadrature mixer and said second
quadrature mixer in response to said band switching signal.

15 15. A communication method of a multiband data
communication apparatus as claimed in claim 11, 12, or 13, wherein
said phase shifting step includes:

a first supplying step for supplying said local
oscillation signal to one of said first quadrature mixer and said
second quadrature mixer;

20 a phase shifting step for shifting the phase of said local
oscillation signal by $\pi/2$;

an inverting step for inverting a code of said output
signal of said phase shifting step; and

25 a second supplying step for supplying one of said output
signal of said phase shifting step and the output signal of said
inverting step to the other of said first quadrature mixer and

said second quadrature mixer in response to said band switching signal.

16. A communication method of a multiband data
5 communication apparatus as claimed in claim 11, 12, or 13, wherein
said phase shifting step includes:

But
a first supplying step for supplying said local
oscillation signal to one of said first quadrature mixer and said
second quadrature mixer;

10 a phase delaying step for delaying the phase of said local
oscillation signal by $\pi/2$;

a phase advancing step for advancing the phase of said
local oscillation signal by $\pi/2$; and

15 a second supplying step for supplying one of the output
signal of said phase delaying step and the output signal of said
phase advancing step to the other of said first quadrature mixer
and said second quadrature mixer in response to said band switching
signal.

20 17. A communication method of a multiband data
communication apparatus including quadrature demodulating means
for converting either a reception signal or a reception
intermediate frequency signal into a quadrature reception
baseband signal, for receiving by switching a plurality of
25 frequency bands in response to a band switching signal, said

communication method comprising:

a storing step for saving thereinto discrete data of a frequency pattern component functioning as a base;

an address generating step for generating an address
5 every preselected clock;

a phase shifting step for adding a predetermined number based upon said band switching signal to said address;

Handwritten: 2000-0000-0000-0000
10 a first analog converting step for analog-converting data which is read out by addressing said storing step based on the address outputted from said address generating step to thereby supply the analog-converted data to one of first quadrature mixers for converting either the reception signal or the reception intermediate frequency signal into a reception baseband signal; and

15 a second analog converting step for analog-converting data which is read out by addressing said storing step based on the output of said phase shifting step to thereby supply the analog-converted data to the other of said first quadrature mixers.

20

18. A communication method of a multiband data communication apparatus including quadrature modulating means for converting a quadrature transmission baseband signal into either a transmission signal or a transmission intermediate
25 frequency signal, for transmitting by switching a plurality of

frequency band in response to a band switching signal, said communication method comprising:

a storing step for saving thereinto discrete data of a frequency pattern component functioning as a base;

5 an address generating step for generating an address every preselected clock;

a phase shifting step for adding a predetermined number based upon said band switching signal to said address;

10 a first analog converting step for analog-converting data which is read out by addressing said storing step based on the address outputted from said address generating step to thereby supply the analog-converted data to one of second quadrature mixers for converting a transmission baseband signal into either the transmission signal or the transmission intermediate
15 frequency signal; and

a second analog converting step for analog-converting data which is read out by addressing said storing step based on the output of said phase shifting step to thereby supply the analog-converted data to the other of said second quadrature
20 mixers.

19. A communication method of a multiband data communication apparatus including quadrature modulating means for converting a quadrature transmission baseband signal into
25 either a transmission signal or a transmission intermediate

frequency signal; and quadrature demodulating means for converting either a reception signal or a reception intermediate frequency signal into a quadrature reception baseband signal; and for transmitting/receiving by switching a plurality of frequency bands in response to a band switching signal, said communication method comprising:

a storing step for saving thereinto discrete data of a frequency pattern component functioning as a base;

an address generating step for generating an address every preselected clock;

a phase shifting step for adding a predetermined number based upon said band switching signal to said address;

a first analog converting step for analog-converting data which is read out by addressing said storing step based on the address outputted from said address generating step to thereby supply the analog-converted data to one of a first quadrature mixer and a second quadrature mixer, said first quadrature mixer converting either the reception signal or the reception intermediate frequency signal into a reception baseband signal, and a second quadrature mixer converting a transmission baseband signal into either the transmission signal or the transmission intermediate frequency signal; and

a second analog converting step for analog-converting data which is read out by addressing said storing step based on the output of said phase shifting step to thereby supply the

analog-converted data to the other of said first quadrature mixer
and said second quadrature mixer.

20. A storage medium for storing thereinto a computer
5 readable program used to execute the communication method of the
multiband data communication apparatus as recited in claim 11,
12, 13, 14, 15, 16, 17, 18, or 19.

004220 002550

Add B1